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A new species of *Amblyodus* Westwood, 1878 (Coleoptera, Melolonthidae, Dynastinae) from South America

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Abstract

A second species of *Amblyodus* Westwood, 1878, *A. castroi* **sp. n.**, is described from the northern South America based on 12 specimens from Brazil and Peru (Amazonian subregion). The new species is here compared with the type species of the genus, *A. taurus* Westwood, 1878 and both species and their male genitalia are illustrated. Diagnostic characters for the genus are discussed, especially the metatibial teeth. A distribution map including the type species and the new species is provided. The genus *Amblyodus* is recorded for the first time from Peru and from Brazil states of Pará and Rondônia.

Keywords

Amazonian subregion, Phileurini, South America, taxonomy

Introduction

Amblyodus was described by Westwood (1878) and until now was known only by the type species, *A. taurus* Westwood, restricted to some Central American countries (Blackwelder 1944; Endrödi 1977, 1985; Lachaume 1992; Ratcliffe 2003 and Ratcliffe and Cave 2006). In a recently published paper, Gasca and Aguiar (2008) re-

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corded the genus for the first time from South America (Brazilian Amazon) based on six specimens collected between the Juruá and Purus rivers. However, they wrongly identified the species as *A. taurus*.

After studying these specimens and additional six specimens, three from Peru and three from Brazil, we concluded that all these material belong to a new species of *Amblyodus* which is here described and compared with the type species of the genus. The diagnostic characters are discussed. A distribution map is provided, including a new country locality from Peru.

Material and methods

The specimens were examined under a dissecting stereomicroscope at magnification of 0.8–50×. Description of external morphological features and conventions follow in part Endrödi (1985) and Ratcliffe and Cave (2006). Images of specimens were captured with a digital camera and assembled in the Automontage software. Label data were separated by single slash "/" for the type material.

The phylogenetic species concept of Wheeler and Platnick (2000) was used in this work: "A species is the smallest aggregation of (sexual) populations or (asexual) lineages diagnosable by a unique combination of characters states."

Specimens examined for this work were provided by seven institutions and private collections. Acronyms for institutions are mostly taken from Samuelson et al. (2001), as follows:

CEMT Coleção Entomológica da Universidade Federal do Mato Grosso, Cuiabá, MT, Brazil (F. Z. Vaz-de-Mello)

EPGC Everardo and Paschoal Grossi Private Collection, Nova Friburgo, RJ, Brazil (E. J. Grossi)

JSC Jochen P. Saltin Private Collection, Niedernhausen/Taunus, Germany (J. P. Saltin)

IOC Instituto Oswaldo Cruz, Rio de Janeiro, RJ, Brazil (J. M. Costa)

MIIS Museo Insectarium Internacional de Santiago, Sanriago, Chile (S. Castro)

UFAM Universidade Federal do Amazonas, Manaus, AM, Brazil (N. O. Aguiar)

MIUP Museo de Invertebrados G. B. Fairchild, Universidade de Panamá, Panamá (R. A. Cambra T.)

Key to the *Amblyodus* species

1 Frontal horns distinctly divergent. Pronotal disc weakly declivous, almost horizontal, punctures predominantly C-shaped; lateral carina not high. Internal margin of parameres almost parallel; apical external carina of parameres in lateral view complete ..... ***A. taurus* Westwood**

– Frontal horns not distinctly divergent, instead parallel. Pronotal disc more declivous, with punctures predominantly reticulated, not C-shaped; lateral carina high. Internal margin of parameres concave; apical external carina of parameres in lateral view incomplete.....***A. castroi* sp. n.**

Taxonomy

***Amblyodus castroi* Grossi & Grossi, sp. n.**
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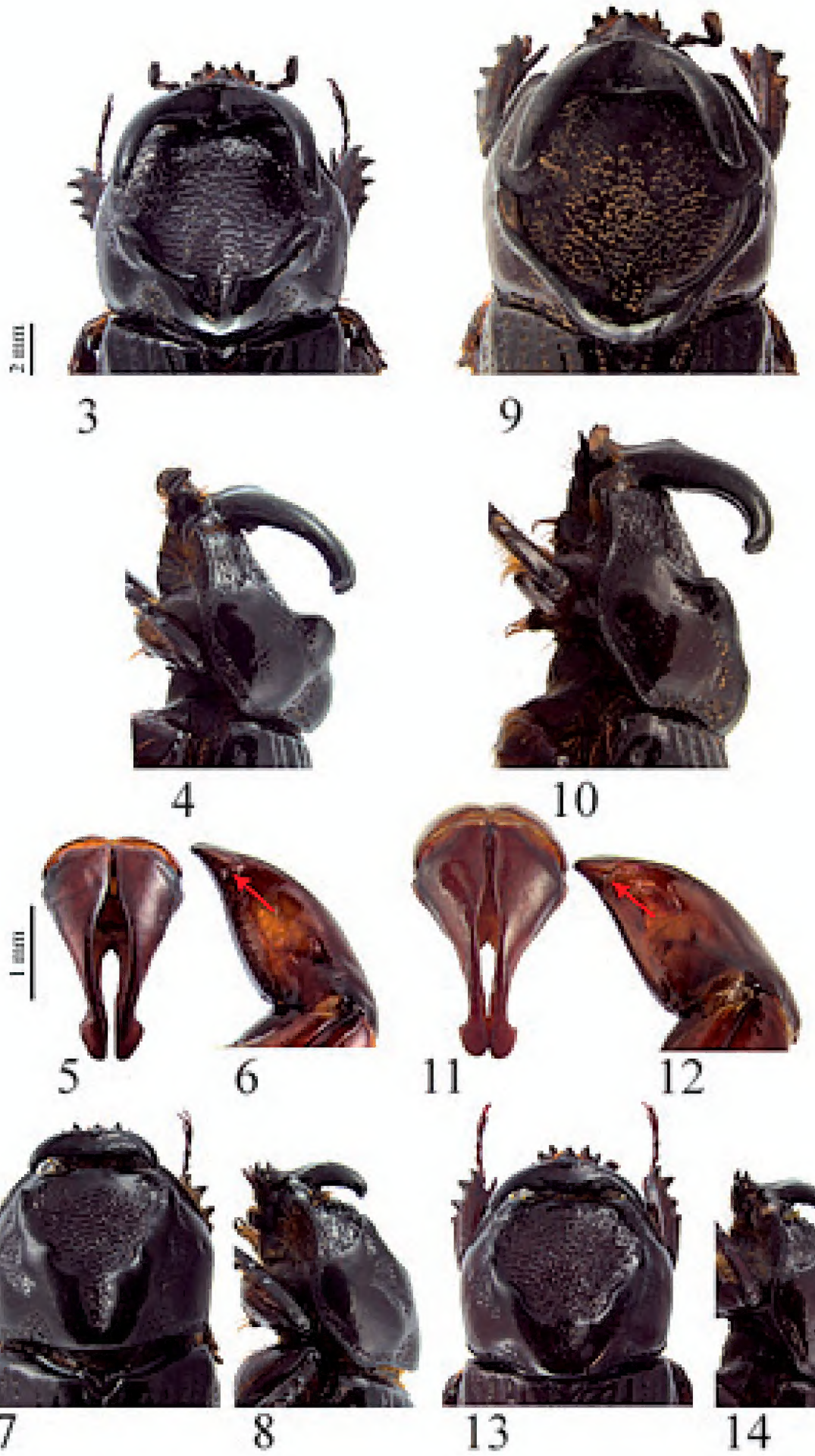
Figs 1–8, 13, 14

Material examined. Holotype male, dissected, labeled: a) "male symbol label"; b) "Brasil, Amazonas, Uarini,/ 03°02'57"S/ 65°41'42"W,/ 22/VII-03/VIII/1995, P./ Bührnhein, N.Aguiar & al."; c) handwritten label "NO ALBURNO DE/ TRONCO CAÍDO/ 01/VIII/1995" (UFAM).

Paratypes, 4 males and 7 females labeled: 1 female a) "female symbol label", b) "Brasil, Amazonas, Uarini,/ 03°02'57"S/ 65°41'42"W,/ 22/VII-03/VIII/1995, P./ Bührnhein, N.Aguiar & al."; c) handwritten label "NO ALBURNO DE/ TRONCO CAÍDO/ 01/VIII/1995" (CEMT). 3 females labeled "Brasil, Amazonas, Coari,/ Duto

Figures 1–2. Habitus of *Amblyodus castroi* sp. n., male holotype. **1** Dorsal view **2** Lateral view.



Figures 3–14. *Amblyodus* spp. **3–4** Head and pronotum of a male major of *A. castroi* in dorsal and lateral views respectively **5–6** Parameres of *A. castroi* in caudal and lateral views respectively **7–8** Head and pronotum of a female of *A. castroi* in dorsal and lateral views respectively **9–10** Head and pronotum of *A. taurus* in dorsal and lateral views respectively **11–12** Parameres of *A. taurus* in caudal and lateral views respectively **13–14** Head and pronotum of a male minor of *A. castroi* in dorsal and lateral views respectively. Arrows indicate apical lateral carina, **6** (incomplete) and **12** (complete).

Urucu/Porto Terminal,/ 04°50'16"S/ 65°20'36"W,/ 16/VI/1996, Buhmheim (*sic*),/ PF, Aguiar, NO, Arruda,/ AMR & Gualberto, TL col." (UFAM). 1 male labeled a) "Brasil, Amazonas, Coari,/ Duto Urucu/Porto Terminal,/ 04°50'16"S/65°20'36"W,/ 16/VI/1996, Bühmheim (*sic*),/ P.F. & Aguiar, N.O. col."; b) handwritten label "Em tronco/ caído" (EPGC). 1 female labeled "PERU, Junin, Puerto/ Ocopa, I-2007, 600m/ 11°07'50"S/74°17'46"W/ S.Castro col." (EPGC). 1 female a) "BRASIL: Rondônia: Porto/ Velho, margem direita/ do Rio Madeira, IX-2004" (EPCG). 1 male labeled "PERU, Ucayali, Via/ Puerto Ocopa-Ucayali,/ XII-2009, 1200m,/ 11°03'51"S/74°15'39"W/ S. Castro col." (MIIS); 1 male labeled "PERU, Junin,Huerto/ Eden c.a, near Puerto/ Prado XII-2009/ 1800m, local collector" (JSC). 1 male labeled a) "BR 14, Km 92/ Pará, Brasil/ E. Lobato XII. 60" (IOC). 1 female labeled a) handwritten label "S. Paulo de/ Olivença/ Solimões/ VIII. – Fassl", b) "Coleção/ J. F. Zikan" (IOC). All paratypes additionally labeled, yellow label, "*Amblyodus castroi*/ PARATYPE/ Grossi & Grossi.

Diagnosis. Head with frontal horns less divergent, being almost parallel (Fig 3). Pronotal disc more declivous than in *A. taurus* with lateral carinae distinctly higher in males majors (Fig 4), posterior furrow deeply excavated as opposed to a less excavated furrow in *A. taurus* (Figs 9 and 10). Aedeagus with internal margin of parameres concave, not parallel; external margin less constricted than in *A. taurus* where internal margin is almost parallel, and external margin abruptly constricted (Figs 11 and 12).

Holotype description (Figs 1 and 2). Total body length 20 mm. Total pronotal width 9.2 mm. Body elongated, about 2 times longer than wide, color dark brown dorsally and reddish brown ventrally; dorsal surface glabrous, with sterna being setose. *Head*: Surface smooth and glabrous with sparse micropunctures; in frontal view with two lateral, concave areas with scattered C-shaped puntures. Clypeus subtriangular, laterally bordered and slightly upturned, convex and with acute apex. Canthi intruding upon eyes just before first third. Frons with two erect, diverging, posteriorly recurving horns. Interocular width equals 3.3 mm. Mandibles tridentate with inner tooth more acute; teeth upturned. Antennae 10 segmented with scape as long as the 6 next segments; club with segments subequal in length. *Pronotum:* Shape trapezoidal, narrower than both elytra together; discal area with C-shaped punctures combined with reticulated areas, flat and declivous; anterior border incomplete. Lateral and posterior sides of pronotal depression strongly carinated, anterior carina more pronounced, higher, being convex and wider posteriorly; carina at base weakly emarginate; carina posteriorly interrupted at middle by a longitudinal furrow, internally weakly angulate; furrow about 4.5 times narrower than head width. Anterior angles acute, posterior angles rounded. Outer side and lateral posterior side of pronotal surface punctate; punctures ocellate, sometimes coalescent, posteriorly larger. *Elytra:* Discal area with 5 rows of large ocellate punctures, rows weakly impressed. Interstriae slightly convex, with scattered small punctures. Lateral edges with 5 similar rows of ocellate punctures, instead of by some ocellate punctures between third and fourth rows. *Pygidium:* Shape convex in lateral view; surface densely punctate; punctures ocellate, moderately sized, elongate near dorsal margin. Sixth ventrite sinuous at middle. *Legs:* Protibiae quadridentate, proximal tooth smaller, distal ones bigger. Metatibiae with 5 apical teeth. *Parameres:*

Shape symmetrical, narrower at apex; apex dilated, laterally roundly angulated, apically rounded, triangle shaped; internal side of each paramera concave, not parallel (Fig 5). In lateral view shaft constricted, with a post-anterior concavity; dorso-ventral carina incomplete, not reaching ventral margin; with a flat, truncate tooth near base (Fig 6).

Female paratypes. Similar to male in general aspects except for the following characters: *Head:* Frontal horns less developed and never reaching pronotal middle. *Pronotum:* Pronotal depression narrower, near anterior margin smooth, not punctate; lateral carina smaller with a weak acute projection before first third (Figs 7 and 8); pronotal furrow longer, ending just before posterior margin. *Pygidium:* Shape wider laterally and shorter, with punctures smaller. Sixth ventrite not sinuous at middle.

Variation of male paratypes. Smaller males possess less developed and less posteriorly recurving frontal horns. Pronotal carina very weakly pronounced (Figs 13 and 14).

Etymology. The species is named *castroi* in homage of Sergio Castro who provided us with part of the paratypes from Peru.

Remarks. When recording the new occurrence of *A. taurus* for South America, Gasca and Aguiar (2008) misapplied the name *A. taurus* to the material they had on hand. Actually both species of *Amblyodus* are similar in appearance, which is common in Phileurini. The authors also stated that the only two genera of the tribe that possess elongate frontal horns were *Amblyodus* and *Oryctophileurus* Kolbe, 1910. However, *Ceratophileurus* Ohaus, 1911 also possess this character in both sexes (Gillett et al. 2010).

Amblyodus and *Oryctophileurus* share the lateral pronotal carina and pronotal shape: elongate, widely flattened, depressed with discal depression totally wrinkled. Additionally, both genera have almost no external sexual dimorphism, as females also possess a well-developed frontal horn, a feature that makes the distinction between genders difficult, being the shape of the last sternite the better way to determine gender in these cases. Moreover parameres have almost the same shape, and the shape of prosternal process is also shared between *Amblyodus* and *Oryctophileurus*, namely flat ventrally and with a spine-like process posteriorly. Based on several morphological characters, there is a possibility that *Oryctophileurus* could be a synonym of *Amblyodus* because the unique feature to distinguishing both genera is the number of frontal horns, one or two, which is not a good character within Dynastinae as some genera are usually extremely allometric. Only with the examination of the type species of *Oryctophileurus*, will it be possible to affirm if they are congeneric or not.

The holotype male is an incomplete specimen and it was apparently damaged by an axe during collecting inside dead logs. It is the same male specimen illustrated by Gasca and Aguiar (2008, figure 1, male in lateral view).

The genus *Amblyodus* is recorded for the first time from Peru and from Brazil states of Pará and Rondônia (Fig 15). It is possible that *A. castroi* occurs in all the Amazonian subregion.

Characters used to diagnose the genus by Ratcliffe (2003) and Ratcliffe and Cave (2006) are confirmed with the new species described here, except for the presence of six teeth on the apex of the metatibiae. In *A. castroi*, that is a variable character, as the number of teeth may be five or six.

Figure 15. Known distribution map of *Amblyodus* species. *A. taurus* (circles) and *A. castroi* (squares).

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References

Blackwelder RE (1944) Checklist of the coleopterous Insects of Mexico, Central America, West Indies and South America. U. S. National Museum Bulletin 185: 220–265.

Endrödi S (1977) Monographie der Dynastinae. 8. Tribus: Phileurini, amerikanische Arten I (Coleoptera). Folia Entomologica Hungarica 30: 7–45.

Endrödi S (1985) The Dynastinae of the World. Dr. W. Junk, Dordrecht, Netherlands, 800 pp., 46 plates.

Gasca Alvarez HJ, Aguiar Otaviano N (2008) Primer Registro de Amblyodus taurus Westwood, 1878 (Scarabaeidae: Dynastinae: Phileurini) em Brasil. Acta Zoologica Mexicana (nueva serie) 24: 221–224.

Gillett CPDT, Drumont A, Ponchel Y (2010) The rare rhinoceros beetle, *Ceratophileurus lemouti* Ohaus, 1911, in French Guiana and Suriname (Coleoptera, Scarabaeidae, Dynastinae, Phileurini). ZooKeys 34: 193–198.

Lachaume G (1992) Dynastidae Américains. Cyclocephalini-Agaocephalini-Pentodontini-Oryctini-Phileurini. Les Coléoptères du Monde 14. Sciences Nat, Venette, France. 56, 83–89, plates 1–11.

Ratcliffe BC (2003) The Dynastine Scarab Beetles of Costa Rica and Panama (Coleoptera, Scarabaeidae, Dynastinae). Bulletin of the University of the Nebraska State Museum 16: 1–506 pp.

Ratcliffe BC, Cave RD (2006) The Dynastine Scarab Beetles of Honduras, Nicaragua and El Salvador (Coleoptera: Scarabaeidae: Dynastinae). Bulletin of the University of the Nebraska State Museum 21: 1–424 pp.

Samuelson A, Evenhuis N, Nishida G (2001) The Insect and Spider Collections of the World Web Site. Bishop Museum, Honolulu, HI. http://hbs.bishopmuseum.org/coden/coden-search.html [accessed: March 2010].

Wheeler QD, Platnick NI (2000) The phylogenetic species concept. p. 55–69. In: Wheeler QD, Meier R (Eds) Species concepts and phylogenetic theory. Columbia University Press; New York, NY, 224 pp.

Westwood JO (1878) Descriptions of some exotic lamellicorn beetles. The Transactions of the Entomological Society of London, viii: 27–37, plates 1–2.